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10/578,915	05/09/2006	Kouji Okamoto	2006_0669A	4443

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EXAMINER	
VLAHOS, SOPHIA	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,915	OKAMOTO ET AL.	
	Examiner	Art Unit	
	SOPHIA VLAHOS	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *5/09/06* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/12/06*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1 Acknowledgment is made of applicant's claim for foreign priority (JP 2003-281845 filing date 11/11/03) under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 7/12/06 has been considered by the examiner.

Drawings

3. Figures 10-11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 3-4, 10, 14, 18, 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the previously-set" in line 8 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 3 recites the limitation "the initial value" in lines 3, 5 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "the initial value" in lines 3, 5 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claims 10, 14, 18, 22 recite the limitation "the operation setting control signal" in line 4of the respective claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (U.S. 2001/0009608)(submitted by applicant in 7/12/06 IDS) in view of Lucky (U.S. 3,617,948) and Van Den Enden (U.S. 5,504,633).

With respect to claim 1, Tanaka et al disclose: an equalizer which makes an input signal subjected to an equalization process according to an equalization coefficient (Fig. 1, function of equalizer 127, under the control of block 129 equalizer control circuit, ¶0043-0044); a PLL which extracts a clock synchronized with the input signal, using an out of the equalizer (¶0055, the PLL 113);an equalization performance detecting unit that detects an equalization performance of the equalizer (Fig. 1, function of blocks 117 and 129, ¶0091-0092, where the equalizer control circuit 119 "judges the status of the equalizing operation of the equalizer 107 on the basis of the outputs of the detection circuits 1033A to 1033E"); and an equalization coefficient determining unit that updates the previously set equalization coefficient (Fig. 1, function of blocks 117 and 119, Fig. 13 to Fig. 14(a) and (b), ¶0105-0109, for example Fig 14(a) shows a equalized waveform which is asymmetrical with respect to portion t0 because the equalizing characteristic of the equalizer is not optimum, adjusting the equalizing characteristic of the equalizer, corrects the equalized waveform (in the direction of arrows 1404 and 1403 of Fig. 14(a)), according to an output value of the equalization performance detecting unit, and outputs the updated value (control values supplied to equalizer 107 by equalizer control circuit).

Tanaka et al. do not disclose: an FIR filter; the equalization coefficient determining unit that weights the previously- set equalization coefficient of the FIR filter,

the left and right taps, with respect to a center tap when the number of taps in the FIR filter is an odd number, and with respect to a central delay line when the number of taps in the FIR filter is an even number, and outputs the weighted value.

In the same field of endeavor (signal equalization), Lucky discloses: an FIR filter (functioning as an equalizer) (Fig. 1, column 2, lines 13-15); the equalization coefficient determining unit that weights the previously- set equalization coefficient of the FIR filter, the left and right taps, with respect to a center tap when the number of taps in the FIR filter is an odd number, and outputs the weighted value (Fig. 1, function of attenuators controlled by block 17, when the equalizer functions over time previous filter coefficients are weighted) adapted, the number of taps is odd see C_{-N} to C_N column 4, lines 2-6 explain the central tap is normalized to unity).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tanaka et al. based on Lucky et al. so that an adaptive FIR filter is used as an equalizer (transversal filters are miniaturized compared to bulky inductance capacitance filters which increase in size and complexity) and adjust the transfer function of the equalizer (which generates equalized waveforms to be asymmetric as shown in Fig. 14(a) and (b) of Tanaka).

Neither Tanaka nor Lucky expressly disclose: weighting the previously-set equalization coefficient of the FIR filter, for left and right taps, with respect to a central delay line when the number of taps in the FIR filter is an even number.

However, in the field of transversal filters, Van Den Enden discloses an FIR filter is configured with either even or odd number of taps (column 7, lines 40-47, in the case

when even number of taps are used, no central tap exists and the even taps are symmetric around a central delay line).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tanaka and Lucky based on the teachings of Van Den Enden so that an FIR filter with even number of taps is used in the system.

With respect to claim 2, the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: the equalization coefficient determining weights the equalization coefficient of the FIR filter symmetrically, with respect to the center tap when the number of taps in the FIR filter is an odd number, and with respect to a central delay line when the number of delay taps in the FIR filter is an even number, before the PLL reaches the locked state (Fig. 1 of Tanaka, prior to the PLL 113 locking onto digital data (i.e. when the system is initialized), i.e. before the clock signal is extracted, there is not correction of the equalizer frequency response, the equalized signal is as shown in Fig. 14(a) and then a correction takes, place. Prior to the PLL lock, the equalizer control circuit does not alter the equalization response of the equalizer or weighting by unity of all filter taps takes place).

With respect to claim 3, the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit weights, while the tap coefficient of the FIR filter is an odd number, the initial value of the equalization coefficient at left with respect to a center tap of the FIR

filter by a factor, thereby to output the weighted value (case when the equalizer of Tanaka is a transversal FIR filter as taught by Lucky, and has an even number of taps).

Neither Tanaka nor Lucky or Van Den Enden expressly disclose: a factor of n (n is a real number which is equal to 0 or larger and equal to 2 or smaller), and weights the initial value of the equalization coefficient at right by a factor of (2-n))

However, FIR filter design (by controlling the filter coefficients) to obtain a desired signal output is known in the art, and it would have been obvious to a person of ordinary skill in the art to modify Tanaka et al (to use a factor of n (n is a real number which is equal to 0 or larger and equal to 2 or smaller), and weights the initial value of the equalization coefficient at right by a factor of (2-n)) as part of adjusting the filter response so that a desired equalized signal is obtained (see adjustment of equalizer frequency response (Fig. 14(a) or (b)) to obtain an output waveform like the one show in Fig. 13) while taking into account filter design specifications and restrictions.

With respect to claim 4, the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit weights, while the tap coefficient of the FIR filter is an even number, the initial value of the equalization coefficient at left with respect to a center of a delay line of the FIR filter by a factor (case when the equalizer of Tanaka is a transversal FIR filter as taught by Lucky, and has an odd number of taps).

Neither Tanaka nor Lucky or Van Den Enden expressly disclose: factor of n (n is a real number which is equal to 0 or larger and equal to 2 or smaller), and weights the

initial value of the equalization coefficient at right by a factor of (2-n), thereby to output the weighted value.

However, FIR filter design (by controlling the filter coefficients) to obtain a desired signal output is known in the art, and it would have been obvious to a person of ordinary skill in the art to modify Tanaka et al (to use a factor of n (n is a real number which is equal to 0 or larger and equal to 2 or smaller), and weights the initial value of the equalization coefficient at right by a factor of (2-n)) as part of adjusting the filter response so that a desired equalized signal is obtained (see adjustment of equalizer frequency response (Fig. 14(a) or (b)) to obtain an output waveform like the one show in Fig. 13) while taking into account filter design specifications and restrictions.

With respect to claim 5, all of the limitations of claim 5 are rejected above in claim 3 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the value of weighting n is independently set for each pair consisting of two taps which are at equal distances from the center tap of the FIR filter (case when the FIR equalizing filter has an odd number of taps and its frequency response adjustment involves weighting the taps around the center tap and Lucky discloses independent setting of the filter taps in Fig. 1).

With respect to claim 6, all of the limitations of claim 6 are rejected above in claim 4 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the value of weighting n is independently set for each pair

consisting of two taps which are at equal distances from the center of the delay line of the FIR filter (case when the FIR equalizing filter has an even number of taps and its frequency response adjustment involves weighting the taps around the center of the delay line (no center tap exists in this case) and adjustment of the taps is performed independently as shown by Lucky in Fig. 1).

With respect to claim 7, all of the limitations of claim 7 are rejected above in claim 3 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit determines an optimum output value of the equalization performance detecting unit , and determines the value of weighting n which provides an optimum output value of the equalization performance detecting unit (Tanaka ¶0091-0093, where the adjustment of the equalizer response is performed so that the output signal is shown in Fig. 13 (compared to Fig. 14(a),(b) and Fig. 15) where the equalizer frequency response has to be changed).

With respect to claim 8, all of the limitations of claim 8 are rejected above in claim 7 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit captures the output of the equalization performance detecting unit at variable time intervals, and determines the value of weighting n on the basis of the captured value (Tanaka, ¶0098-0099 the processing operation of the microcomputer inside the equalizer control circuit is repeatedly executed at a predetermined timing).

With respect to claim 9, all of the limitations of claim 8 are rejected above in claim 7 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit establishes an upper limit and a lower limit and an update interval thereof, independently, for the value of weighting n, and determines the value of weighting n within the established range (Fig. 13 the ideal symmetric equalized waveform, compared to the not ideal equalization output shown in Figures 14, 15, ¶0107-.0111, and based on the teachings of Lucky, the upper and lower limit refer to the upper and lower frequency band of the equalizer frequency response as determined by the number of taps in the equalizer and the update interval thereof corresponds to the spacing between the taps).

With respect to claim 10, all of the limitations of claim 10 are rejected above in claim 7, and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit establishes an operation of detecting the value of weighting n which provides an optimum output value of the equalization performance detecting unit on the basis of the operation setting control signal in accordance with the characteristics of the input signal (Fig. 10 the evaluation circuit 117, ¶0091-0092, judges the status of the equalizer based on the outputs of the circuits 1033A through 1033E, which receive decoded input signal 1001, and are controlled by clock signal 1019 which functions as the claimed operation setting control signal, ¶0079-0080).

With respect to claim 11, all of the limitations of claim 11 are rejected above in claim 4, and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit determines an optimum output value of the equalization performance detecting unit , and determines the value of weighting n which provides an optimum output value of the equalization performance detecting unit (Tanaka ¶0091-0093, where the adjustment of the equalizer response is performed so that the output signal is shown in Fig. 13 (compared to Fig. 14(a),(b) and Fig. 15) where the equalizer frequency response has to be changed).

With respect to claim 12, all of the limitations of claim 12 are rejected above in claim 11, and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit captures the output of the equalization performance detecting unit at variable time intervals, and determines the value of weighting n on the basis of the captured value (Tanaka, ¶0098-0099 the processing operation of the microcomputer inside the equalizer control circuit is repeatedly executed at a predetermined timing).

With respect to claim 13, all of the limitations of claim 8 are rejected above in claim 11 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit

establishes an upper limit and a lower limit and an update interval thereof, independently, for the value of weighting n, and determines the value of weighting n within the established range (Fig. 13 the ideal symmetric equalized waveform, compared to the not ideal equalization output shown in Figures 14, 15, ¶0107-.0111, and based on the teachings of Lucky, the upper and lower limit refer to the upper and lower frequency band of the equalizer frequency response as determined by the number of taps in the equalizer and the update interval thereof corresponds to the spacing between the taps).

With respect to claim 14, all of the limitations of claim 14 are rejected above in claim 11, and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit establishes an operation of detecting the value of weighting n which provides an optimum output value of the equalization performance detecting unit on the basis of the operation setting control signal in accordance with the characteristics of the input signal (Fig. 10 the evaluation circuit 117, ¶0091-0092, judges the status of the equalizer based on the outputs of the circuits 1033A through 1033E, which receive decoded input signal 1001, and are controlled by clock signal 1019 which functions as the claimed operation setting control signal, ¶0079-0080).

With respect to claim 15, all of the limitations of claim 15 are rejected above in claim 5 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit determines an optimum output value of the equalization performance detecting unit , and determines the value of weighting n which provides an optimum output value of the equalization performance detecting unit (Tanaka ¶0091-0093, where the adjustment of the equalizer response is performed so that the output signal is shown in Fig. 13 (compared to Fig. 14(a),(b) and Fig. 15) where the equalizer frequency response has to be changed).

With respect to claim 16, all of the limitations of claim 16 are rejected above in claim 15 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit captures the output of the equalization performance detecting unit at variable time intervals, and determines the value of weighting n on the basis of the captured value (Tanaka, ¶0098-0099 the processing operation of the microcomputer inside the equalizer control circuit is repeatedly executed at a predetermined timing).

With respect to claim 17, all of the limitations of claim 17 are rejected above in claim 15 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit establishes an upper limit and a lower limit and an update interval thereof,

independently, for the value of weighting n, and determines the value of weighting n within the established range (Fig. 13 the ideal symmetric equalized waveform, compared to the not ideal equalization output shown in Figures 14, 15, ¶0107-.0111, and based on the teachings of Lucky, the upper and lower limit refer to the upper and lower frequency band of the equalizer frequency response as determined by the number of taps in the equalizer and the update interval thereof corresponds to the spacing between the taps).

With respect to claim 18, all of the limitations of claim 18 are rejected above in claim 15, and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit establishes an operation of detecting the value of weighting n which provides an optimum output value of the equalization performance detecting unit on the basis of the operation setting control signal in accordance with the characteristics of the input signal (Fig. 10 the evaluation circuit 117, ¶0091-0092, judges the status of the equalizer based on the outputs of the circuits 1033A through 1033E, which receive decoded input signal 1001, and are controlled by clock signal 1019 which functions as the claimed operation setting control signal, ¶0079-0080).

With respect to claim 19, all of the limitations of claim 19 are rejected above in claim 6 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit

determines an optimum output value of the equalization performance detecting unit , and determines the value of weighting n which provides an optimum output value of the equalization performance detecting unit (Tanaka ¶0091-0093, where the adjustment of the equalizer response is performed so that the output signal is shown in Fig. 13 (compared to Fig. 14(a),(b) and Fig. 15) where the equalizer frequency response has to be changed).

With respect to claim 20, all of the limitations of claim 20 are rejected above in claim 19 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit captures the output of the equalization performance detecting unit at variable time intervals, and determines the value of weighting n on the basis of the captured value (Tanaka, ¶0098-0099 the processing operation of the microcomputer inside the equalizer control circuit is repeatedly executed at a predetermined timing).

With respect to claim 21, all of the limitations of claim 21 are rejected above in claim 19 and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit establishes an upper limit and a lower limit and an update interval thereof, independently, for the value of weighting n, and determines the value of weighting n within the established range (Fig. 13 the ideal symmetric equalized waveform, compared to the not ideal equalization output shown in Figures 14, 15, ¶0107-.0111,

and based on the teachings of Lucky, the upper and lower limit refer to the upper and lower frequency band of the equalizer frequency response as determined by the number of taps in the equalizer and the update interval thereof corresponds to the spacing between the taps).

With respect to claim 22, all of the limitations of claim 22 are rejected above in claim 19, and the system obtained by modifying Tanaka based on Lucky and Van Den Enden, further discloses: wherein the equalization coefficient determining unit establishes an operation of detecting the value of weighting n which provides an optimum output value of the equalization performance detecting unit on the basis of the operation setting control signal in accordance with the characteristics of the input signal (Fig. 10 the evaluation circuit 117, ¶0091-0092, judges the status of the equalizer based on the outputs of the circuits 1033A through 1033E, which receive decoded input signal 1001, and are controlled by clock signal 1019 which functions as the claimed operation setting control signal, ¶0079-0080).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is (571)272-5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SOPHIA VLAHOS/
Examiner, Art Unit 2611
4/8/2009

/David C. Payne/
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